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ABC AND VED ANALYSES OF FREE DRUG STORE IN DRUG AND PHARMACY OF SKIMS – A TERTIARY CARE INSTITUTE IN JAMMU AND KASHMIR, INDIA

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ABSTRACT

INTRODUCTION

For buying materials and supplies, including medicines, about one-third of the annual hospital budget is spent. The principles of rational drug use and inventory management techniques such as ABC and VED analyses can be of provision to more number of patients in the existing budget.

METHODOLOGY

To study the drug expenditure at the free drug store in the drug and pharmacy services of SKIMS, ABC, VED and ABC-VED matrix analyze is were used.

RESULTS

At SKIMS, the drug formulary of the free drug store consisted of 105 drugs, and in 2014-15, the Annual Drug Expenditure (ADE) was Rs. 16,126,133.18, especially for procurement of these drugs;19 (18.10%), 22 (20.95%) and 64 (60.95%) items were in the A,B and C categories, respectively, costing Rs. 11,353,070.04 (70.40%), Rs.3,163,441.45 (19.62%) and Rs.1,609,621.33 (09.98%), respectively; and 39 (37.14%), 42 (40%) and 24 (22.86%) items were grouped into V, E and D categories, respectively, spending on these items Rs.6,226,472.15 (38.61%), Rs.6,976,673.95 (43.26%) and Rs. 2,922,987.08 (18.13%). ABC-VED analyses revealed that Category I constituted 52 (49.52%) items, Category II constituted 35 (33.34%) items and Category III constituted 18 (17.14%) items of the formulary of free drug store in pharmacy store, involving financial implications of Rs. 13,382,295.55 (82.99%), Rs. 2,309,950.55 (14.32%) and Rs.433,887.08 (2.69%), respectively.

CONCLUSIONS

ABC and VED analyses can be of great help in effective and efficient utilization of hospital funds and elimination of out-of-stock situations in the hospital pharmacy.

***KEYWORDS*: Hospital Pharmacy, Effective and Efficient Utilization, ABC- Always Better Control, VED- Vital, Essential, Desirable, ABC-VED Matrix&ADE-Annual Drug Expenditure**

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Original Article

INTRODUCTION

Healthcare industry is a labour-intensive organization. Though salaries and fringe benefits account for roughly60%of operating costs in a hospital, 30-35%of costs are incurred on materials and supplies like drugs etc[1].For buying materials and supplies, including medicines,about one-third of the annual hospital budget is spent[2].It cannot be denied that stocking hospital pharmaceuticals and suppliescan be expensive, thereby locking up a lot of capital.Bringingefficiencies to such important cost drivers, often 30-40% of a hospital's budget, can present meaningful savings[3].The hospital supply system'sintentionis adequate stock of the required items so that all essential items are supplied without any interruption. According to the Department of Personnel and Administrative Reforms in India, the quantity of medicines received is not directly proportional to the requirement,and also the supply is often haphazard. There are instances of the common medicines becoming out of stock and this situation remainsfor a long period[4]. A study of a 1,500-bed state-funded hospital has revealed that review and control measures for expensive drugsbrought about 20% savings[5]. All essential supportive servicesfor any hospital are provided mainly by the pharmacy stores.Therefore, as the hospitals grow in size, the pharmacy stores should be in a stable position to meet the need of the growing hospitals. Nowadays patients are very particular about quality health care services[2].Efficient clinical and administrative services are achieved by good planning, designing and organizing the pharmacyand also by appropriate utilization of the existing resources[6]. More number of patients can benefitwith the existing drug budget, but only if rational drug use and improved drug management practices are followed. Hence,at less cost,health managers should use scientific methods to maximize their returns from investment[7-9].To ensure uninterrupted supply of many items continuously, stores management plays a vital role in the hospitals.

In a developing country like India, hospital pharmacy inventory control is essential[10].To monitor every drug in the health system is impossible andunnecessary too.Due to this high-cost and high-volume drugs came into picture, where inventory control intervention is likely to cause the greatest clinical and economic impact. In the whole process, tracing the costliest medicinal products that consume the major portion of the budget and further designing a strategy to further study and identify their usage pattern is essential to help appropriate corrective measures. The important tool that is used worldwide is the ABC analysis,which identifies items that are in need of control[7-11].Specific Scientific methods are to be used by health managers to maximize investment returns to a minimal cost.Cost containment and improved efficiencyare the two major factors which the drug inventory management stresses upon[12].Therefore efficient inventory system policies should be adopted by the hospital materials manager to ensure that the hospital can meet with emergency demand conditions[13].Following the principles of rational drug use and inventory management techniques is the need of the hour in order to cater more number of patients withinexisting budget[14].

In developing country like India, with scarce resources inventory control is must to monitor the economic investment in materials and products in order to achieve maximum financial returns."Stretching the limited means to meet theunlimited ends" is the basic economic concept of inventory control techniques of which ABC analysis is one of the method of classifying items or activities according to their relative importance.The contribution of a group to a common effect is relatively accounted by a few contributors for a majority of the effects, as the saying goes "separating the vital few from the trivial many"[10]. The intention of ABC Analysis,also called as "Always Better Control"is to control the best, then the better andlastly the good, based on the cost.On analyzing the cost factor of various inventories, we can divide the inventories into three parts A, B and C.It has been found thatin most organizations the, 10% items of inventory are

attributing nearly 70% of the totalmonetary value of the inventory, next 20% of the itemsattribute to 20% of the monetary value of inventory and remaining 70% of items of inventory attribute to just 10% of the monetary value of the inventory [10](table 1).

Table 1: ABC Analysis

Item	Percentageof Item	Percentage of Monetary Value
A	10%	70%
B	20%	20%
C	70%	10%

For category A the management of items should be done by top management so that there is strict control, to estimate the accurate requirements, to monitor closely and maintain a low buffer stock.In the case of Category B, management is done bymiddle level so that they have moderatecontrol, purchase done based on the requirement, reasonablystrict monitoring and control and maintain a moderate buffer stock.Category C, here it is taken care by the lower level management, needs only a ordinary control, purchase done based on the usage, controlled by store keeper.Monetary value and the rate of consumption of theitem are the limitations of ABC analysis.In a hospital, an item of low monetary value may be very important or even lifesaving.Though they are not categorized in the A group they cannot be simply overlooked and so another important parameter of the materials is their criticality[8].

VED Analysis deals with criticality of the items in relation to the function of hospital. Vital (V) items are essential for the hospital to perform its functions viz a viz patient care, more buffer stocks are to be ensured at all times to have a higher degree of safety andtheir availability. Vital items are to be monitored by the top management. Essential (E) items are important and without them hospital has ability to function for a short period but it may affect the patient care quality to a limited extent. Essential items are to be controlled by the middle level management. Desirable (D) items are items which on absence do not seriously affect the functioning of the hospital for a specific time and they can be monitored by the low level management[10].

ABC-VED Matrix

ABC and VED analyses combined together can be used to properly control the material supplies.The Category I includes all the vital and expensive items. Category II includes of the remaining items of E and B groups. Category III consists of the desirable and the cheaper item (Figure 1).

ABC and VED analyses combined together and grouped to form a priority system of store management.

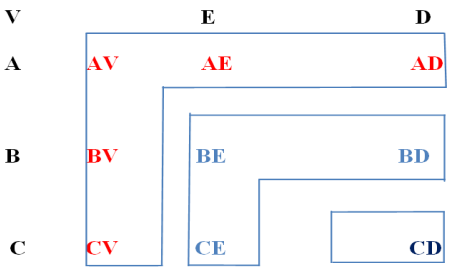

Figure1: ABC-VED Matrix

Items of category I are most important and are controlled by higher level administrator. Category II which is controlled by the office incharge of the store is of intermediate importance. An item of category III is of less importance and is under the control of the storekeeper (Figure 1).

This study was conducted in the drug and pharmacy services at Sher-i-Kashmir Institute of Medical Sciences (SKIMS), a tertiary care hospital in Kashmir Valley with 850 beds. This study was to find the drug management through the inventory control methods like ABC, VED and ABC-VED matrix analysis in order to maximize the returns at a minimal cost.The drug and pharmacyservices havethree major free stores viz. Free Drug Store, I.V Fluid Store, and Surgical Dressing Store. This study was conducted in the free drug store.

MATERIALS AND METHODS

In the year 2015, a study was conducted at the free drug store to analyze the drug expenditure, using the inventory control techniques ABC,VED and ABC-VED matrix analysis. From the results,the annual consumption and expenditure incurred on each drug were obtained.The data collected was in a pre-designed format and then it was transcribed into a MS Excel spreadsheet.The statistical analysis was done using the MS Excel statistical functions. ABC, VED and ABC-VED matrix analysis were done using following parameters and procedures:

ABC Analysis

ABC cost analysis was carried out for allthedrugs inthe inventory of free drug store of drug and pharmacy. The Annual Drug Expenditure (ADE) of each drug was formatted in a descending order.The cumulative cost of all the items was calculated.The cumulative percentage of expenditure and number of items was also calculated.Basedonthecumulativecostpercentage this list was further subdivided into three categories.

VED Analysis

The VED analysis was done byclassifyingthedrugsintoVital(V), Essential(E)andDesirable(D)categories.List of inventory of free drug store was provided to the Clinical experts from General Medicine, General Surgery, Critical Care &Anesthesia and Pharmacy of SKIMS in the form of proforma and the drugs were categorized as Vital (V), Essential (E) and Desirable (D) by the experts, based on their expertise and usage. The filled proforma received were analyzed and optimum results obtained were recorded.

ABC-VED Matrix

The ABC-VED matrix was stated by cross tabulating the ABC and VED analyses.The resultant combination was classified into three categories (categories I, II and III).Category I was comprised of drugs belonging to AV, AE, AD, BV and CV sub-categories. Category II consists of BE, CE and BD subcategories and in category III comprised theremaining subcategory CD. From the subcategories, we can understand that the first alphabet represents its place in the ABC analysis and the second alphabet stands for its place in the VED analysis.

RESULTS

The free drug formularyconsisted of 105 drugs. In 2014-2015,the ADE of Rs. 16,126,133.18 was incurred for obtaining of items in free drug store out of a total expenditure of Rs 24,000,000.

ABC Analysis

Of the 105 items in total in the drug formulary, 19(18.10%),22(20.95%) and 64% (60.95%) items were in A, B and C formulations respectively which had a cost of Rs. 11353070.04 (70.40%), Rs.3163441.45 (19.62%) & Rs.1609621.33 (09.98%) respectively(Table 2).

The cutoffs when compared were about 70%,20% and 10% which were acceptable.Study shows that ABC analysis would help in effective control of the recommended 19 items in the A category, with 70% of ADE of the drug store.

Table 2

Category	No. of Items (Percentage)	Cumulative Cost in Rupees (Percentage)
A	19 (18.10%)	11353070.04 (70.40%)
B	22 (20.95%)	3163441.45 (19.62%)
C	64 (60.95%)	1609621.33 (09.98%)

VED Analysis

Of 105 items in total at the free drug store, V,E and D categories consisted of 39(37.14%), 42 (40%) and 24 (22.86%) items respectively making a sum of Rs.6226472.15 (38.61%), Rs.6976673.95 (43.26%) and Rs. 2922987.08 (18.13%) which was spent on these items in their respective categories. 67.14% is the majority number of items which contribute to Vital and Essential category of free drugs available to the patients (Table 3).

Table 3

Category	No. of Items (Percentage)	Expenditure in Rupees (Percentage)
V	39 (37.14%)	6,226,472.15 (38.61%)
E	42 (40.00%)	6,976,673.95 (43.26%)
D	24 (22.86%)	2,922,987.08 (18.13%)

ABC-VED Matrix

On cross tabulating the ABC and VED tables correlating the ABC-VED matrix analysis, there were nine different sub-categories which were formed and further they got sub-divided into three categories namely category I, II and III.Out of 105 items, it was found that,52 (49.52%) items,35 (33.34%) itemsand 18 (17.14%) were constituted in categories I, II and III respectively of the free drug store formulary, which implies a finance of Rs. 13382295.55 (82.99%), Rs. 2309950.55 (14.32%) & Rs.433887.08 (2.69%) respectively (Table 4a &4b).

Table 4(a)

	V	E	D
A	06	10	03
B	10	09	03
C	23	23	18

Table 4(b)

Category	No. ofItems (Percentage)	Expenditure in Rupees (Percentage)
I	52 (49.52%)	13382295.55 (82.99%)
II	35 (33.34%)	2309950.55 (14.32%)
III	18 (17.14%)	433887.08 (02.69%)
Total	**105 (100%)**	**16126133.18 (100%)**

CAT I=52 (49.52%)
CAT II= 35 (33.34%)
CAT III= 18(17.14%)

ABC-VED Matrix enables in focusing on 52 items (49.52%)of Category I, for strict managerial control as these items are either expensive or vital. The annual expenditure of these items was Rs. 13,382,295.55 (82.99 %)of ADE in the free drug store in pharmacy. In addition, higher level administrators need to manage or control the expensive and vital, i.e. AV items 06 (5.71%), accounting for Rs 4,197,247 (26.1%) of ADE. CV items 23 in number (21.90% of total items) are drugs of low cost but having high criticality and take up Rs 647,544.05 (4.2%) of ADE of free drug store of the pharmacy. These items can be procured once a year because the financial implications are low. Higher level administrators need to have a direct control ofthese items.

Certain items such as Category II items, 35 in number (33.34%), costing Rs. 2,309,950.55 (14.32%) of the ADE of free drug store ,can be ordered once or twice a year and hence saving the ordering cost and reducing management hiccups at a moderate carrying cost and without blocking substantial capital. Under the CE category of category II, there are 23 items out of a total of 105, i.e., they are of low cost but very essential for patient care. A middle-level administrator needs to manage/control these items.

In CategoryIII i.e. CD category items, 18 out of total 105 items consume Rs 433,887.08 (2.7%) of the ADE of free drug store in pharmacy.These items are of low cost and are desirable for patient care.These items can also be ordered once or twice a year, thereby saving on ordering cost and carrying cost without blocking substantial capital and can also be managed by lower level administrator.

Table 5: (ADE=Annual Drug Expenditure in Indian Rupees, % Refers to Percentage of ADE)

	V			E			D			Total		
	ADE in Rs	% Age	No. of Drugs	ADE in Rs	%age	No. of Drugs	ADE in Rs	% Age	No. of Drugs	ADE in Rs	% Age	No. of Drugs
A	4197247	26.1	06	5130453.40	31.8	10	2025370	12.6	03	11353070.40	70.40	19
B	1354681.10	08.1	10	1345030.35	08.4	09	463730	02.9	03	3163441.45	19.62	22
C	674544.05	04.2	23	501190.20	03.2	23	433887.08	02.7	18	1609621.33	09.98	64
Total	**6226472.15**	**38.4**	**39**	**6976673.95**	**43.4**	**42**	**2922987.08**	**18.2**	**24**	**16126133.18**	**100**	**105**

CONCLUSIONS

Thus the study pronounces that cost is an important factor because 70.40% of the ADE implied on the free drug store items were consumed by 19.95% of the drugs, 37.14% of drug were vital in the eyes of patient of care provider and consumed 38.14% of ADE and 49.52% of items which belonged to Category I of the ABC-VED matrix consumed 82.99%

of ADE.

In the year 2014-15, at the hospital pharmacy store of SKIMS, the ADE for free drugwas Rs.16,126,133.18, amounting to 67.2% of total budget, which is equivalent to Rs 24,000,000 for free drugs and items in drug and pharmacy for the year 2014-15.Therefore, for optimum management of the drug stores and close supervision on drug items belonging to important categories for optimum utilization of ADE, it is very crucial to implement scientific inventory management tools. Thus, for effective and efficient utilization of hospital funds and to completely arrest out-of-stock situations in the hospital pharmacy, ABC and VED analyses can be of great help.

RECOMMENDATION

In order to have an optimum management and close supervision of the whole drug store which contains lot more items including drugs in sale store like drugs, surgical items and cardiaccatheterization laboratory items, further study needs to be done so that there is effective & efficient utilization of hospital funds and out of stock situations in the hospital pharmacy does not arise.

DISCLOSER

There was no conflict of interests and the study was not sponsored by anyone.

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